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(56) Documents cited
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(54) Tread depth indicator

(57) A tread depth indicator 10 is arranged to be held in a groove 21 in the tread of a tyre and comprises a plurality of layers (11-13 Fig 2), arranged parallel to the surface of the tread, each layer having a different visual appearance, for example a different colour. Layers 12 and/or 13 may be fluorescent ultraviolet light. The indicator 10 may be held in place by the elasticity of the walls of the groove 21 or by adhesive or heat sealing. A warning message can be incorporated in the middle and inner layers 12, 13.

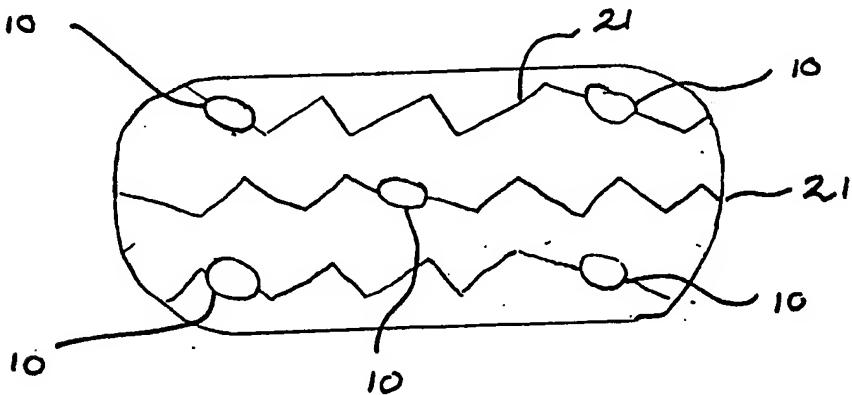


Fig 3

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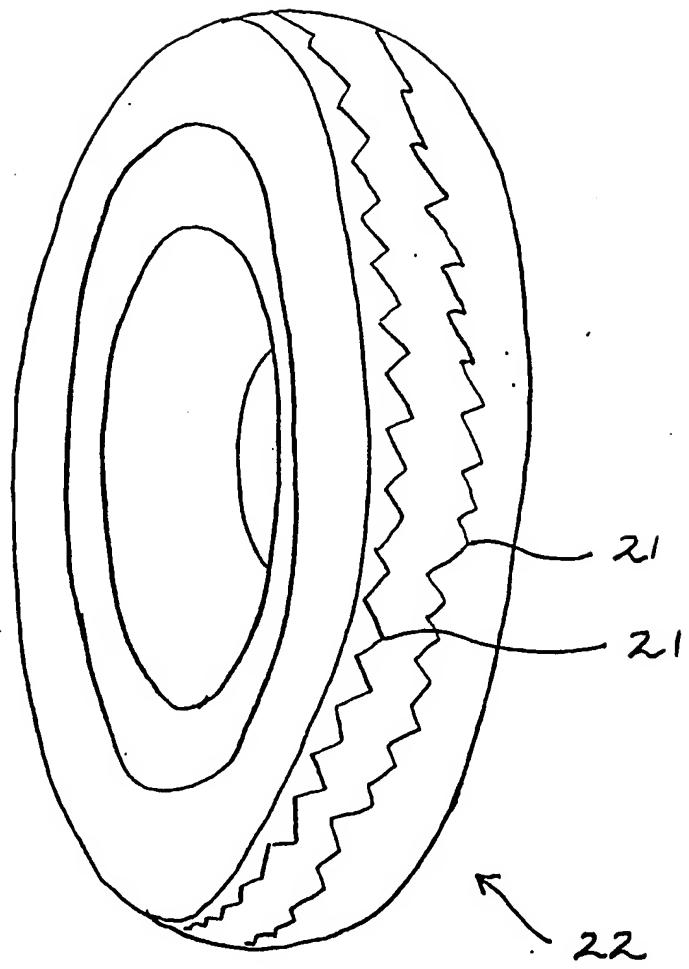


Fig 1.

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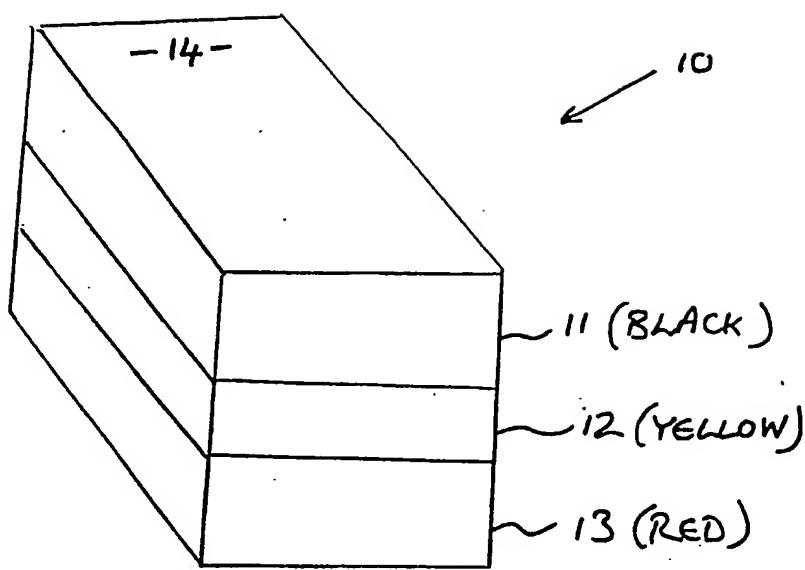


Fig 2.

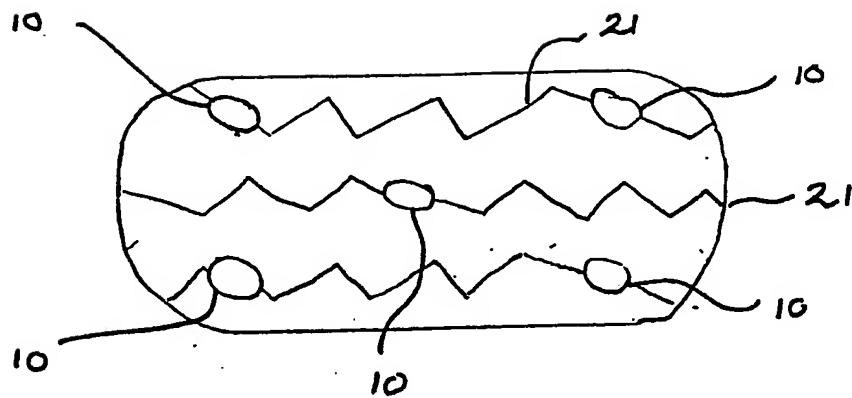


Fig 3

Tread Depth Indicator

The invention relates to devices for monitoring tyre wear on vehicles, and in particular to devices for indicating the tread depth.

- 5 If the tread on a vehicle tyre is allowed to wear below a minimum depth the efficiency of the tyre is reduced. This makes the vehicle more difficult to handle and stop safely. To prevent this, the depth of tread on the tyres must be regularly measured with a gauge.
- 10 This is a time consuming process.

According to a first aspect of the invention there is provided a tread depth indicator being arranged to be held in a groove in the tread of a tyre, the indicator comprising a plurality of layers, being arranged parallel to the surface of the tread, wherein each layer has a different visual appearance.

- 20 According to a second aspect of the invention there is provided a method of monitoring the tread depth on a tyre using a tread depth indicator according to the first aspect of the invention, comprising the step of fixing the tread depth indicator in a groove in the tread with the layers parallel to the surface of the tread, whereby different layers become exposed to view as the tread becomes progressively worn in use.

- 30 In a preferred arrangement each of the layers is a different colour. When the tread is worn to its minimum safe depth a red layer is exposed to view.

Preferably, the tread depth indicator comprises a

grommet that is held in a groove in the tread. The grommet is held by the elasticity of the walls of the groove.

- 5 Preferably, each tread depth indicator is made from a material that wears at the same rate as the tread of the tyre.

10 According to a third aspect of the invention there is provided a tyre comprising a tread having one or more tread depth indicators, each tread depth indicator comprising a plurality of layers extending parallel to the surface of the tread, with each of the layers having a different visual appearance.

15 According to a fourth aspect of the invention there is provided a method of making a laminated tyre, comprising the steps of forming a first layer having one or more parts thereof formed of a material having a first visual appearance, and forming a second layer over the first layer, the second layer having one or more portions of a second visual appearance overlaying said part(s) of the first layer, wherein said part(s) are formed in the tread of the tyre.

25 In order that the invention and its other features may be understood more easily an embodiment thereof will now be described, by way of an example only, with reference to the drawings, wherein:-

30 Fig.1 is a schematic perspective view of a vehicle tyre;

Fig. 2 is a perspective view of the tread depth indicator; and

5 Fig. 3 is a plan view of a tyre that is fitted with a plurality of tyre depth indicators.

The tread depth indicator comprises a rubber grommet block or stud 10. Each grommet is made from three parallel layers 11,12,13 of different coloured rubber.
10 The outer layer 11 is black, the middle layer 12 is yellow, and the inner layer 13 is red and is also visible at night.

For use with a car tyre, each grommet 10 is 4-6mm high.
15 The outer layer 11 is 2-4mm thick. The middle layer 12 and the inner layer 13 are both 1mm thick. The grommet has a width of 5-6mm and a length of 7-8mm. For smaller or larger tyres the size of the grommet is correspondingly altered.

20 Each grommet 10 is formed to fit in grooves 21 formed in the tread 22 of a tyre. The grommet is pushed into a groove 21 in the tyre. When fitted, the outer surface 14 of the grommet is flush with the surface of the tread 22. The grommet is held in place by the elasticity of the walls of the groove 21.

A plurality of grommets 10 can be fitted to single tyre, to measure wear at different parts of the tread.
30 The grommets are positioned at 30-38 cm intervals in parallel rows extending along the middle of the tread, and along each side of the tread (Fig.3).

Figure 3 shows five grommets 10 that are fitted to a tyre. When the tyre has an acceptable depth of tread on it only the black outer layer 11 of each grommet is visible, and the tyre resembles any other black tyre.

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As the tyre is used, both the tread and the grommets 10 wear down until the black, outer layer 11 is worn away completely, leaving the yellow, middle layer 12 exposed. This indicates that the tyre will become 10 unsafe and illegal after a further 1mm of tread has been worn away. This 1mm of tread will last for about 1000 to 2000 miles, depending on the driver and the vehicle. Factors affecting the rate of wear include whether the vehicle is front or rear wheel drive, and 15 the amount of motorway use.

If the vehicle is further used, the tread and grommets 10 wear until the fluorescent red, inner layer 13 is exposed. This indicates that the tyre is illegal and 20 should not be used. The inner layer 13 is easily observed by law enforcement officers in both day and night-time.

The tread depth indicator allows a driver or operator 25 to visually monitor the depth of tread on the tyres of a vehicle. This avoids the need to measure the depth of tread with a gauge.

The appearance of the yellow, middle layer 11 of the 30 grommet allows the driver or operator to make arrangements for new tyres to be fitted to the vehicle before they become unsafe.

The visual distinctiveness of the worn grommets assists law enforcement officers in apprehending vehicles with unsafe tyres.

- 5 The tread depth indicator can be modified in a number of ways. Grommets can be incorporated in the tread 22 during the production of the tyre.

- 10 The grommets can be made in a variety of different shapes. They may be elongate to extend along the groove or be circular. The grommets may have a hollow central core.

- 15 The grommets can be fixed in the groove with an adhesive or by heat sealing.

- 20 The layers 11-13 may be made visually distinctive by incorporating reflective particles in the middle layer 12 and/or the inner layer 13. The middle and/or inner layers may be made of any suitable fluorescent material. The middle layer 12 and/or the inner layer 13 may be made of a material that is fluorescent when exposed to ultraviolet light.

- 25 For simplicity of manufacture, the middle layer 12 can be omitted from the grommets.

A warning message can be incorporated in the middle and inner layers 12,13 of the grommets.

- 30 The whole of the tread 22 can be made from layers of different colour rubber.

Each grommet may be formed from two right angled wedges of different coloured material, so that as the grommet wears a greater portion of the lower wedge becomes visible.

Claims

1. A tread depth indicator being arranged to be held in a groove in the tread of a tyre, the indicator comprising a plurality of layers being arranged parallel to the surface of the tread, wherein each 5 layer has a different visual appearance.
2. A tread depth indicator according to claim 1, wherein each of the layers is a different colour.
- 10 3. A tread depth indicator according to claim 2, wherein a red layer is exposed to view when the tread is worn to its minimum safe depth.
- 15 4. A tread depth indicator according to any preceding claim, comprising a grommet that is held in a groove in the tread.
- 20 5. A tread depth indicator according to claim 4, wherein the grommet is held by the elasticity of the walls of the groove.
6. A tread depth indicator substantially as described herein with reference to Figures 2 and 3 of the drawings.

7. A method of monitoring the tread depth on a tyre using a tread depth indicator according to any preceding claim, comprising the step of fixing the tread depth indicator in a groove in the tread with the 5 layers parallel to the surface of the tread, whereby different layers become exposed to view as the tread becomes progressively worn in use.
8. A method of monitoring the tread depth on a tyre 10 substantially as described herein with reference to Figures 2 and 3 of the drawings.
9. A tyre comprising a tread having one or more tread depth indicators, each tread depth indicator comprising 15 a plurality of layers extending parallel to the surface of the tread, with each of the layers having a different visual appearance.
10. A tyre comprising a tread having one or more tread 20 depth indicators, substantially as described herein with reference to Figures 2 and 3 of the drawings.
11. A method of making a laminated tyre, comprising the steps of forming a first layer having one or more 25 parts thereof formed of a material having a first visual appearance, and forming a second layer over the first layer, the second layer having one or more portions of a second visual appearance overlaying said part(s) of the first layer, wherein said part(s) are 30 formed in the tread of the tyre.
12. A method of making a laminated tyre substantially as described herein.